



[4910-13]

## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 25**

**Docket No. FAA-2010-1193; Amdt. No. 25-136**

**RIN 2120- AJ80**

Harmonization of Airworthiness Standards for Transport Category Airplanes - Landing Gear Retracting Mechanisms and Pilot Compartment View

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** The Federal Aviation Administration amends the airworthiness standards for transport category airplanes on landing gear retracting mechanisms and the pilot compartment view. For the landing gear retracting mechanism, this rulemaking adopts the 1-g stall speed as a reference stall speed instead of the minimum speed obtained in a stalling maneuver and adds an additional requirement to keep the landing gear and doors in the correct retracted position in flight. For the pilot compartment view, this rulemaking revises the requirements for pilot compartment view in precipitation conditions. This action eliminates regulatory differences between the airworthiness standards of the U.S. and the European Aviation Safety Agency (EASA), without affecting current industry design practices.

**DATES:** Effective [insert 60 days after date of publication in the Federal Register].

**ADDRESSES:** For information on where to obtain copies of rulemaking documents and other information related to this final rule, see “How To Obtain Additional Information” in the SUPPLEMENTARY INFORMATION section of this document.

**FOR FURTHER INFORMATION CONTACT:** For technical questions concerning this action, contact Mahinder Wahi, Federal Aviation Administration, Propulsion and Mechanical Systems Branch, ANM-112, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, WA 98057; telephone (425) 227-1262; facsimile 425-227-1320, e-mail mahinder.wahi@faa.gov.

For legal questions about this proposed rule, contact Doug Anderson, FAA, Office of the Regional Counsel (ANM-7), 1601 Lind Avenue SW, Renton, Washington 98057; telephone (425) 227-2166; facsimile 425-227-1007; email Douglas.Anderson@faa.gov.

## **SUPPLEMENTARY INFORMATION:**

### **Authority for this Rulemaking**

The FAA's authority to issue rules on aviation safety is found in Title 49 of the United States Code. Subtitle I, Section 106 describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the agency's authority.

This rulemaking is promulgated under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, the FAA is charged with promoting safe flight of civil aircraft in air commerce by prescribing regulations and minimum standards for the design and performance of aircraft that the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority. It prescribes new safety standards for the design and operation of transport category airplanes.

### **List of Abbreviations Frequently Used In This Document**

Term	Definition
V <sub>S</sub>	the stalling speed or the minimum steady flight speed at which the airplane is controllable

$V_{SI}$	the stalling speed or the minimum steady flight speed obtained in a specific configuration.
$V_{SR}$	reference stall speed and may not be less than a 1-g stall speed
$V_{SR1}$	reference stall speed in a specific configuration
1-g stall speed	minimum speed at which the airplane can develop the usable maximum lift force capable of supporting the weight of the airplane

### **List of Acronyms Frequently Used In This Document**

ALPA	Airline Pilots Association
ANAC	Agência Nacional de Aviação Civil
ARAC	Aviation Rulemaking Advisory Committee
EASA	European Aviation Safety Agency
FAA	Federal Aviation Administration
ICAO	International Civil Aviation Organization
JAA	European Joint Aviation Authorities
NPRM	Notice of Proposed Rulemaking
RFA	Regulatory Flexibility Act
SBREFA	Small Business Regulatory Enforcement Fairness Act

## **I. Overview of Final Rule**

This action harmonizes airworthiness certification standards for landing gear mechanisms and pilot compartment view for transport category airplanes with those of EASA. Harmonizing these airworthiness standards reduces costs to airplane manufacturers and operators while retaining the level of safety.

## **II. Background**

### A. Statement of the Problem

This rulemaking results from an agreement between the European Joint Aviation Authorities (JAA), the predecessor to EASA, and the FAA to harmonize certain airworthiness standards between the two authorities. Differences between the regulations of the FAA and foreign certification authorities increase the cost and complexity of certification without contributing significantly to safety. These rules result from the recommendations of the Aviation Rulemaking Advisory Committee, through its Mechanical Systems Harmonization Working Group (MSHWG).

### B. Summary of the NPRM

The FAA published a notice of proposed rulemaking (NPRM), Docket No. FAA-2010-1193; Notice No. 10-19 in the Federal Register on January 5, 2011 (76 FR 472). The NPRM proposed to amend the standards for landing gear retraction mechanism and pilot compartment view to harmonize with the corresponding EASA standards. The proposed standards for landing gear addressed reference stall speed, positive means to keep the landing gear and doors in the correct retracted position, gear position indication, and protection of equipment on the landing gear and in the wheel well. The proposed standards for pilot compartment view addressed single failures of rain removal systems, alternatives to the openable side window requirement and certain environmental conditions.

The comment period for the NPRM ended on April 5, 2011.

### C. General Overview of Comments

The FAA received comments from Airbus, Boeing Company, Bombardier, Cessna Aircraft Company, Embraer, Hawker Beechcraft, Transport Canada, and Air Line Pilots

Association, International (ALPA). ALPA, Airbus, Bombardier, and Cessna provided general comments in support of the proposed changes.

Embraer correctly noted that a proposed text change to § 25.729(a)(3) was unnecessary since EASA had already adopted the current FAA standard. The proposed change to § 25.729(a)(3) is therefore withdrawn. Boeing, Transport Canada, and Hawker Beechcraft proposed changes to the regulatory text. Embraer requested that the FAA wait for the final rule issuance of NPRM 10-10, Airplane and Engine Certification Requirements in Supercooled Large Drop, Mixed Phase, and Ice Crystal Icing Conditions (75 FR 37311, June 29, 2010) (Docket No. FAA-2010-0636) before issuing this final rule. Boeing, Transport Canada and Bombardier noted editorial errors which have been corrected.

#### D. Associated Advisory Circular Guidance Material

Advisory Circular AC 25.729-1 has been revised to incorporate acceptable means of compliance to the amended requirements of this rulemaking action. A draft of this AC was made available for public comment during the comment period of the NPRM. The FAA received comments on the AC from the Brazilian Civil Aviation Authority (Agência Nacional de Aviação Civil - ANAC), Transport Canada, Boeing Company, and Embraer. The disposition of the AC public comments is posted along with the final version of the AC on the FAA Regulatory and Guidance Library website (<http://rgl.faa.gov/>).

### **III. Discussion of Public Comments and Final Rule**

#### A. Effect of Flightcrew Alerting Rule

Boeing recommended the proposed rule for landing gear position indication be revised to be consistent with the new flightcrew alerting rule, § 25.1322. Boeing's rationale is that the

proposed wording of § 25.729(e) in the NPRM is inconsistent with retractable landing gear and associated door indication systems on existing FAA type certificated and recent EASA validated airplanes. Boeing also stated the proposed wording and the associated AC guidance material are inconsistent with the quiet and dark flight deck philosophy used on modern airplanes.

The proposed wording would have required “a clear indication or warning must be provided whenever the landing gear position is not consistent with the landing gear selector lever position.” In some situations, an advisory or caution message would be appropriate, not a warning message. Boeing requested a change to make warning, caution, and advisory messages compliant with §25.1322 and provide information to the flight crew if the gear or doors are not in the commanded position or are in a hazardous configuration. Boeing also recommended deleting § 25.729(e)(7) and rewording paragraph (e) to reference § 25.1322 for alerting.

We agree the specification to provide a “warning” as in the proposed § 25.729(e)(7) is not consistent with the § 25.1322 at the current amendment level. ARAC recommended and EASA adopted the proposed wording prior to the development of the current § 25.1322 requirements. The intent of the wording recommended by ARAC was consistent with the definition of the term “flightcrew alert” in the current § 25.1322. We replaced the wording “clear indication or warning” with “flightcrew alert” to be consistent with § 25.1322. This also addresses the Boeing comment associated with the quiet and dark flightdeck concept. It is not necessary to specifically refer to § 25.1322 in the rule text, as the current version of § 25.1322 will be in the certification basis for new type designs and new significant changes to type design (as determined per 14 CFR § 21.101).

Boeing also noted the regulation does not address other landing gear actuation functions, such as a landing gear lever lock or truck tilt message to prevent retraction or the hazards

associated with retracting an out of configuration gear, or the necessary indication for hazards associated with semi-lever gears or tail skid actuation.

The FAA considers that §§ 25.1301, 25.1309 and 25.1322 adequately address identification and alerting of these hazards and provide the applicant the greatest flexibility in the use of such functions. No change to the rule will be made in this regard.

#### B. Wheel Brake Temperature

Hawker Beechcraft stated the proposed wording for § 25.729(f)(3), “possible wheel brake temperatures,” is not specific enough. Hawker Beechcraft recommends changing the text to “excessive wheel brake temperatures,” or “wheel brakes overheating.” We note that because § 25.729(f) refers to the “damaging effects of” the temperatures, we believe it is clear the regulation refers to high “possible” temperatures. No changes were made to the rule in response to this comment.

#### C. Landing Gear Lock

Transport Canada concurs with the new requirement for a positive means to keep the landing gear and doors in the correct retracted position in flight, and would like a similar requirement for a downlock. As proposed, § 25.729(b) is a performance-based rule that requires positive means to keep the landing gear extended in flight and on the ground. Adding specificity to require a downlock, limits design options that would otherwise meet the intent of the rule without increasing the level of safety. No change to the rule was made in this regard.

#### D. Supercooled Large Drop Rulemaking

Embraer suggested the FAA publish the final rule associated with NPRM Notice No. 10-10, previously referenced on page 5, before proceeding with proposed changes to § 25.773(b) in this rulemaking since the NPRM proposed to change § 25.773(b)(1). This rulemaking includes

changes to § 25.773(b)(2) and additionally to § 25.773(b)(3) and (4), but proposed no changes to § 25.773(b)(1). Since these rulemaking changes are independent of those proposed in the Supercooled Large Drop NPRM, the FAA does not plan to wait on publishing this rule.

#### E. Lightning as a Discrete Damage Source for Pilot Compartment View

Transport Canada requested we add lightning to the list of discrete damage sources presented in § 25.773(b)(4)(ii). The FAA is not aware of any data that indicates lightning has resulted in the reduction of pilot compartment view, therefore changing the regulatory text is unnecessary.

#### F. Differences Between the NPRM and the Final Rule

Except for the editorial correction in the rule title for § 25.729, the withdrawal of proposed text change to § 25.729(a)(3), and the change in amendatory language found in § 25.729(e)(7) from "A clear indication or warning" to "A flightcrew alert," the changes to §§ 25.729 and 25.773 are adopted as proposed.

### **IV. Regulatory Notices and Analyses**

#### A. Regulatory Evaluation

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 and Executive Order 13563 direct that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 (Public Law 96-354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Public Law 96-39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S.



standards, this Trade Act requires agencies to consider international standards and, where appropriate, that they be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Public Law 104-4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of \$100 million or more annually (adjusted for inflation with base year of 1995). This portion of the preamble summarizes the FAA's analysis of the economic impact of the final rule.

Department of Transportation Order DOT 2100.5 prescribes policies and procedures for simplification, analysis, and review of regulations. If the expected cost impact is so minimal that a proposed or final rule does not warrant a full evaluation, this order permits that a statement to that effect and the basis for it be included in the preamble if a full regulatory evaluation of the costs and benefits is not prepared. Such a determination has been made for this final rule.

The reasoning for this determination follows: The final rule will amend the airworthiness standards for transport category airplanes for landing gear retracting mechanisms and pilot compartment view to harmonize with existing, more stringent European Aviation Safety Agency (EASA) requirements. For landing gear retracting mechanisms, the more stringent EASA requirements ensure (1) the landing gear is in the appropriate configuration; (2) the landing gear and its supporting structure, doors, and mechanisms operate properly; (3) the flight crew is aware of the landing gear position status; and (4) critical equipment is protected from tire failure or excessive brake temperatures.

For the pilot compartment view, reliable and safe operation during precipitation is ensured by adoption of the EASA design requirements for flight deck rain removal systems because there will be no single failure of the rain removal system that could lead to a loss of pilot

view through both windshields. The effect of this requirement is that, for newly certificated airplanes, manufacturers must provide a separate, mechanically and electrically independent method for clearing the windshield during precipitation. This method may include separate flight deck control switches for left and right windshield wipers. The FAA has determined that installation of the second wiper switch will require minimal additional costs when the system is initially designed to comply with the EASA requirement and received no comments regarding this estimate.

A review of current practices of U.S. manufacturers of transport category airplanes has revealed that only a minority of manufacturers are not already in compliance with the EASA requirements. For these manufacturers, the FAA has determined that additional costs to comply with the EASA requirements will be minimal and that there will be additional safety benefits from adoption of the more stringent EASA requirements. For the majority of manufacturers already in compliance with the EASA requirements as a means of obtaining joint certification, there will be no additional compliance costs or additional safety benefits. We received no comments regarding this cost estimate. However, the final rule will provide benefits from reduced joint certification costs--in the requirements for data collection and analysis, paperwork, and time spent applying for and obtaining approval from the regulatory authorities. The FAA therefore has determined that this final rule will have minimal costs and positive net benefits and does not warrant a full regulatory evaluation.

The FAA has also determined that this final rule is not a “significant regulatory action” as defined in section 3(f) of Executive Order 12866, and is not “significant” as defined in DOT's Regulatory Policies and Procedures.

#### B. Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (Public Law 96-354) (RFA) establishes “as a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration.” The RFA covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a rule will have a significant economic impact on a substantial number of small entities. If the agency determines that it would, the agency must prepare a regulatory flexibility analysis as described in the RFA. However, if an agency determines that a rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the RFA provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

As noted above, this final rule will impose no or little additional costs on part 25 manufacturers. Moreover, all U.S. manufacturers of transport category airplanes exceed the Small Business Administration small-entity criteria of 1,500 employees. Therefore, the FAA certifies that this final rule will not have a significant economic impact on a substantial number of small entities.

### C. International Trade Impact Assessment

The Trade Agreements Act of 1979 (Public Law 96-39), as amended by the Uruguay Round Agreements Act (Public Law 103-465), prohibits Federal agencies from establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to these Acts, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such the protection of safety, and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards. The FAA has assessed the potential effect of this final rule and determined that it will promote international trade by harmonizing U. S. standards with corresponding EASA regulations thus reducing the cost of joint certification.

#### D. Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (Public Law 104-4) requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of \$100 million or more (adjusted annually for inflation with the base year 1995) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a “significant regulatory action.” The FAA currently uses an inflation-adjusted value of \$141.3 million.

This final rule does not contain such a mandate. The requirements of Title II do not apply.

#### E. Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public. The FAA has determined that there is no new requirement for information collection associated with this final rule.

#### F. International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to conform to International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has determined that there are no ICAO Standards and Recommended Practices that correspond to these regulations.

#### G. Environmental Analysis

FAA Order 1050.1E identifies FAA actions that are categorically excluded from preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act in the absence of extraordinary circumstances. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraph 312d and involves no extraordinary circumstances.

#### H. Regulations Affecting Intrastate Aviation in Alaska

Section 1205 of the FAA Reauthorization Act of 1996 (110 Stat. 3213) requires the FAA, when modifying its regulations in a manner affecting intrastate aviation in Alaska, to consider the extent to which Alaska is not served by transportation modes other than aviation, and to establish appropriate regulatory distinctions. In the NPRM, the FAA requested comments on whether the proposed rule should apply differently to intrastate operations in Alaska. The agency did not receive any comments, and has determined, based on the administrative record of

this rulemaking, that there is no need to make any regulatory distinctions applicable to intrastate aviation in Alaska.

## **V. Executive Order Determinations**

### **A. Executive Order 13132, Federalism**

The FAA has analyzed this final rule under the principles and criteria of Executive Order 13132, Federalism. The agency determined that this action will not have a substantial direct effect on the States, or the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, and, therefore, does not have Federalism implications.

### **B. Executive Order 13211, Regulations that Significantly Affect Energy Supply, Distribution, or Use**

The FAA analyzed this final rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). The agency has determined that it is not a “significant energy action” under the executive order and it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

## **VI. How To Obtain Additional Information**

### **A. Rulemaking Documents**

An electronic copy of a rulemaking document may be obtained by using the Internet:

1. Search the Federal eRulemaking Portal (<http://www.regulations.gov>);
2. Visit the FAA’s Regulations and Policies Web page at [http://www.faa.gov/regulations\\_policies/](http://www.faa.gov/regulations_policies/) or
3. Access the Government Printing Office’s Web page at <http://www.gpo.gov>.

Copies may also be obtained by sending a request (identified by notice, amendment, or docket number of this rulemaking) to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue SW., Washington, DC 20591, or by calling (202) 267-9680.

#### B. Comments Submitted to the Docket

Comments received may be viewed by going to <http://www.regulations.gov> and following the online instructions to search the docket number for this action. Anyone is able to search the electronic form of all comments received into any of the FAA's dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.).

#### C. Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. A small entity with questions regarding this document, may contact its local FAA official, or the person listed under the FOR FURTHER INFORMATION CONTACT heading at the beginning of the preamble. To find out more about SBREFA on the Internet, visit [http://www.faa.gov/regulations\\_policies/rulemaking/sbre\\_act/](http://www.faa.gov/regulations_policies/rulemaking/sbre_act/).

#### **List of Subjects in 14 CFR Part [25]**

Aircraft, Aviation safety.

#### **The Amendment**

In consideration of the foregoing, the Federal Aviation Administration amends part 25 of title 14, Code of Federal Regulations, as follows:

#### **PART 25 - AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES**

1. The authority citation for part 25 continues to read as follows:

**Authority:** 49 U.S.C. 106(g), 40113, 44701-44702, and 44704.

2. Amend § 25.729 by revising paragraphs (a)(1)(ii) and (iii), (b), (e) introductory text, and (e)(5), adding paragraph (e)(7), revising paragraphs (f) introductory text and (f)(1), and adding paragraph (f)(3) to read as follows:

**§ 25.729 Retracting mechanism**

(a) \* \* \*

(1) \* \* \*

(ii) The combination of friction loads, inertia loads, brake torque loads, air loads, and gyroscopic loads resulting from the wheels rotating at a peripheral speed equal to  $1.23V_{SR}$  (with the wing-flaps in take-off position at design take-off weight), occurring during retraction and extension at any airspeed up to  $1.5 V_{SR1}$  (with the wing-flaps in the approach position at design landing weight), and

(iii) Any load factor up to those specified in § 25.345(a) for the wing-flaps extended condition.

\* \* \* \* \*

(b) *Landing gear lock.* There must be positive means to keep the landing gear extended in flight and on the ground. There must be positive means to keep the landing gear and doors in the correct retracted position in flight, unless it can be shown that lowering of the landing gear or doors, or flight with the landing gear or doors extended, at any speed, is not hazardous.

\* \* \* \* \*

(e) *Position indicator and warning device.* If a retractable landing gear is used, there must be a landing gear position indicator easily visible to the pilot or to the appropriate crew



members (as well as necessary devices to actuate the indicator) to indicate without ambiguity that the retractable units and their associated doors are secured in the extended (or retracted) position. The means must be designed as follows:

\* \* \* \* \*

(5) The system used to generate the aural warning must be designed to minimize false or inappropriate alerts.

\* \* \* \* \*

(7) A flightcrew alert must be provided whenever the landing gear position is not consistent with the landing gear selector lever position.

(f) *Protection of equipment on landing gear and in wheel wells.* Equipment that is essential to the safe operation of the airplane and that is located on the landing gear and in wheel wells must be protected from the damaging effects of--

(1) A bursting tire;

\* \* \* \* \*

(3) Possible wheel brake temperatures.

3. Amend § 25.773 by revising paragraph (b)(2) and adding paragraphs (b)(3) and (4) to read as follows:

**§ 25.773 Pilot compartment view.**

\* \* \* \* \*

(b) \* \* \*

(2) No single failure of the systems used to provide the view required by paragraph (b)(1) of this section must cause the loss of that view by both pilots in the specified precipitation conditions.

(3) The first pilot must have a window that—

(i) Is openable under the conditions prescribed in paragraph (b)(1) of this section when the cabin is not pressurized;

(ii) Provides the view specified in paragraph (b)(1) of this section; and

(iii) Provides sufficient protection from the elements against impairment of the pilot's vision.

(4) The openable window specified in paragraph (b)(3) of this section need not be provided if it is shown that an area of the transparent surface will remain clear sufficient for at least one pilot to land the airplane safely in the event of—

(i) Any system failure or combination of failures which is not extremely improbable, in accordance with § 25.1309, under the precipitation conditions specified in paragraph (b)(1) of this section.

(ii) An encounter with severe hail, birds, or insects.

\* \* \* \* \*

Issued in Washington, DC, on December 27, 2011.

Michael P. Huerta  
Acting Administrator

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